A STUDY OF MORPHOLOGY, PROVENANCE, AND MOVEMENT OF DESERT SAND SEAS IN AFRICA, ASIA, AND AUSTRALIA

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1 January 1973

Type I Progress Report for Period 1 November - 31 December, 1973

E74-10398) A STUDY OF MORPHOLOGY,

PROVENANCE, AND MOVEMENT OF DESERT SAND

SEAS IN AFRICA, ASIA, AND AUSTRALIA

Progress Report, 1 Nov. - 31 (Geological Unclas Survey) 12 p HC \$4.00 CSCL 08F G3/13 00398

Prepared for:

Goddard Space Flight Center Greenbelt, Maryland 20771

TYPE I Progress Report ERTS-A

A STUDY OF MORPHOLOGY, PROVENANCE, AND MOVEMENT OF DESERT SAND SEAS IN AFRICA, ASIA, AND AUSTRALIA

By Edwin D. McKee and Carol S. Breed

ABSTRACT

Recent acquisition of generally high quality color prints for most of the test sites has enabled this project to make significant advances in preparing mosaics of sand desert areas under study. Computer enhancement of imagery of selected sites, where details of complex dune forms need to be determined, has been achieved with arrival of computer-compatible ERTS-1 tapes. Further, a comparator, recently received, gives precise visual measurements of width, length, and spacing of sand bodies and so improves comparison of patterns in various test sites.

Moving winds in China, Pakistan, Libya and other study areas enabled much progress to be made in developing overlays for the dune mosaics. These data show direction, speed, and frequency of winds. Other new data for use in preparing overlays used with ERTS image mosaics include ground truth on moisture control, geologic settings, and plant distribution. With the addition of visual observation data and prints from hand-held photography now being obtained by the Skylab 4 mission, much progress in interpreting the patterns of sand seas for 17 desert sites is anticipated.

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Type I Progress Report ERTS-A

- a. Title: A Study of Morphology, Provenance, and Movement of

 Desert Sand Seas in Africa, Asia, and Australia
 - ERTS-A Proposal No.: SR-131
- b. GSFC ID No. of P.I.: IN-402
- c. Problems relating to progress:
- 1. Color processing (of bulk color composite prints) lacks quality control and so new orders are frequently necessary in order to complete mosaics. Some progress in solving this problem has apparently been made, as most recently acquired prints have been of high quality.
- 2. Problems of time and funding as reported earlier have been remedied with the recent receipt of extensions. We will now be able to complete the ERTS-A tasks as planned.

d. Discussion and plans:

- 1. Computer-compatible ERTS-1 tapes have arrived permitting computer enhancement of imagery of selected sites to progress as described in last Type I progress report (p. 5, pt. 1).
- 2. Receipt of a comparator has improved our methods of measuring and comparing dune field morphology. It is being used for precise visual measurements of width, length, and spacing of sand bodies.
- 3. A considerable amount of information concerning meteorological controls has been gathered for dune fields in China, Pakistan, Libya, Mexico, Australia, and South Africa, as well as for several U.S. areas.

Meteorological overlays showing the direction, speed, and percentage frequency of sand-moving winds are in progress for nearly all sites.

Additional overlays relating ground truth data on precipitation, vegetation, sand sources, and geographic barriers to sand movement have been started.

Linear density transparencies of selected sites have arrived. This product is especially useful to our project. It makes possible the analysis of dune fields which cannot be readily seen on the standard transparencies. This type of transparency will constitute the standing order for our ERTS-B project.

The visual observations book for Skylab 4 includes 17 sites in desert areas being studied on ERTS imagery. This mission is now in progress and requested hand-held photographs are being taken. These will be of great value to the ERTS-B phase of this project.

e. Results and application:

Many new overlays for the ERTS image mosaics, showing compilations of ground truth including wind data, moisture data and geologic setting, have been prepared and others are underway.

Working classification of eolian sand bodies has been established and is being tested against incoming ERTS images and ground-based observations.

f. Reports:

A paper entitled "Sand Dunes in Desert Areas" was presented by Carol Breed, coinvestigator, at the Fourth Annual Conference on the Application of Remote Sensing of Arid Land Resources and Environment on Nov. 15, and will be published in the Proceedings of this Conference.

At ERTS-1 Symposium of Dec. 10-13 in Washington, D. C., a report on "An Investigation of Major Sand Seas in Desert Areas throughout the World" was given by E. D. McKee, principal investigator. This report was prepared for publication in the Proceedings of the Symposium.

A summary of our ERTS project formed the basis of a program of desert studies on the hand-held photography mission in earth observation on Skylab 4. McKee and Breed attended a session for briefing the astronauts on this mission, on Saturday, Nov. 3, in Houston.

g. Changes in operation:

None

- h. Changes in standing order forms:
- i. ERTS Image Descriptor forms:
 Attached
- j. Data Request Forms:
 Attached

(See Instructions on Back)

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